

Section 4-7: Combinations of a Set

By the end of this lesson, you should be able to answer:

- How do you find the number of combinations of a set?

Where you might see this in the real world:

- Cooking, travel, music, sports, games

Define the following terms:

1. Combination

2. ${}_nC_r$

In the last lesson, we took a look at permutations, which was seeing how many ways we could arrange items in a particular order. With permutations, order was important. With combinations, we are looking at the ways a set of items can be chosen when order *is not* important. This will be how we decide whether or not to use a permutation or a combination.

If order is important:

If order is not important:

Formula for a permutation:

Formula for a combination:

Of course, it is not always the easiest to figure out whether order is important or not. You will have to ask yourself questions about the situation to see whether a combination or permutation is needed.

Example 1: How many ways can you select 3 committee members from a group of 5 people?

***First we need to decide whether to use a permutation or combination. So we need a question we can ask ourselves about the situation.

Question:

You will notice that just asking the question might not give us enough information to see whether it is a combination or permutation. As you do one of these problems, set up a mock situation like we did in Example 1.

Example 2: How many ways are there to select 5 people for a committee that has 5 openings?

Now let's take a look at some possible combinations. Are they possible? If not, then why not?

a. ${}_5C_6$

b. ${}_5C_{-2}$

c. $_{10.5}C_2$

Combinations can be used as a shortcut for finding probabilities, as well.

Example 3: A card is drawn at random from a standard deck and is set aside. A second card is drawn. What is the probability of drawing two aces?

Homework:

"YOU CANNOT RUN AWAY FROM A WEAKNESS; YOU MUST SOMETIMES FIGHT IT OUT OR PERISH. AND IF THAT BE SO, WHY NOT NOW, AND WHERE YOU STAND?" - ROBERT LOUIS STEVENSON